

Review

8.13.67

Notes on
Carbon

Exene San Diego paper

Read galley & ret 4.9.65

Don. Bacon Vol. 39, no. 3, pp —
May, 1965



Tikvahar

LACM no 2851

Loc. # 1877

ident. as

Quifomes f.

Howard 1965

Length 109.8 mm

" fin length 20.0 "

br. sh middle, 7.3

depth " " 5.9

length lig attached 7.8

(bone pins out to surface)

br. at lig attached

below not

enamel crest 10.0



Types

Protostux

californiensis

Howard

LACM no. 6171

loc # 1723

Palmer view

of humerus

Howard 1965



Type of
Protobrix
californiensis

Howard 1965

LACM 4171

Proximal view

humerus

loc. 1723

1,10.57

MEMORANDUM

To: Dr. Hildegard Howard
from: George P. Kanakoff
Re: Bird bone from San Diego Poway fm.

1877
2851

(+ bird bone)

Mr. Harry R. Turver, after examining the matrix in which the bird bone was collected by Mr. Joseph E. Arndt in Mission Valley, made the following verbal statement:

"We did not find any foraminifera in the sample. It is most likely taken from one of the continental prongs of Poway formation. It looks like the material we had examined before from that area. It does not resemble any other material from that area, as far as I know."

Other Eocene birds of America

~~Alcedo + Troglodytes~~

Graculavus pennatus & *velox* (Connerant) *Amer. Jour. Sci.* 1872, p. 363

Eocrex primus Wetmore *Condor* 33 (1931): 107 figs 21-25 (quadrants)

Paleorallus huxelli " " " " 108 figs 26-29

Telmatornis opus *Amer. Jour. Sci.* 1870 p. 211 (rare)

" *rex* *Duplet Trans. Conn. Acad.* vol. 18, p. 27

" *pusillus* *Amer. Jour. Sci.* p. 210

Quercus maritima Shuf. *Conn. Acad.* 1915 (vol. 19) p. 77

Paropus prentissii (Loomis) *Amer. Jour. Sci.* 1906 p. 481

Fulica albonis & *emendata* Marsh. 1872 *Amer. Jour. Sci.* &
Shuf. 1915 p. 31

Alcedo 4 sps. *Amer. Jour. Sci.* 1872, p. 256-258

Geranoides fessendeni Wet. *Condor* 35 (1933) p. 115

and others

Los Angeles County Museum
900 Exposition Blvd.
Los Angeles, California 90007
June 18, 1964

Messrs. Porter M. Kier
William A. Oliver, Jr.
E202 National Museum Building
Washington, D.C., 20560

Gentlemen:

In this mail the manuscript of my paper on Eocene birds of California is being returned to you.

I have shortened the title as suggested by both Dr. Brodkorb and Dr. Wetmore. I have also added a page on the European owls in line with Dr. Brodkorb's suggestion. This addition entailed adding two references to the bibliography. I hope the manuscript will be acceptable with these insertions, for I would like to avoid having to retype several pages. (My typing being such as it is, the less I retype, the safer it is!).

The reviews and letters from Dr. Brodkorb and Dr. Wetmore are returned with the manuscript.

Yours sincerely,

Hildegarde Howard
Research Associate

THE PALEONTOLOGICAL SOCIETY
Editorial Office
E202 National Museum Building
Washington, D. C. 20560

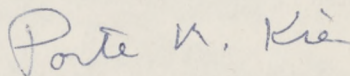
June 5, 1964

Dr. Hildegarde Howard
Los Angeles County Museum
Exposition Park
900 Exposition Boulevard
Los Angeles 7, California

Dear Dr. Howard:

We are returning your manuscript (but holding your plate) together with the two reviews. Please return these reviews with your manuscript. Both of your reviewers were very favorably impressed with your paper. You may do as you please about your title, but their suggestions seem to have merit.

Sincerely,

A handwritten signature in dark ink, appearing to read "Porter M. Kier". The signature is written in a cursive, slightly stylized script.

Porter M. Kier, or
William A. Oliver, Jr.

PMK:WAO:rm



THE PALEONTOLOGICAL SOCIETY

EDITORIAL OFFICE

E 202 NATIONAL MUSEUM BUILDING
WASHINGTON, D.C. 20560



February 9, 1965

Airmail

Dr. Hildegarde Howard
Research Associate, Vertebrate Paleontology
Los Angeles County Museum
Exposition Park
900 Exposition Boulevard
Los Angeles, California 90007

Dear Dr. Howard:

You will receive galley proof in March but must order reprints now since our order must be delivered to the plate printer before text galleys are available. We estimate your paper at 4 pages and 1 plate but it could run as many as 5 pages. Please send your reprint order by return airmail; it will have to be based on this estimate.

Sincerely yours,

William A. Oliver, Jr., or
Porter M. Kier
Co-editors

WAO:PMK:rm

February 5, 1965

Journal of Paleontology,
Messrs. P.M. Kier and W.A. Oliver Jr.
E202 National Museum Building
Washington, D.C. 20560

Gentlemen:

The blank for ordering reprints of my article "First record of avian fossils from the Eocene of California" is just at hand. Of course, I do want reprints, but as I have never seen even galley proof of the paper I do not know how many pages are involved. As the Museum usually bears part of the expense of reprints, I shall have to know more particulars before I can place the order. Can you give me an approximation on page length so I can estimate cost?

Incidentally, I certainly hope I will have an opportunity to see proof before the paper is published.

Yours sincerely,

Hildegard Howard
Research Associate,
Vertebrate Paleontology

THE PALEONTOLOGICAL SOCIETY

Editorial Office
E202 National Museum Building
Washington, D. C. 20560

July 24, 1964

Dr. Hildegarde Howard
Los Angeles County Museum
Exposition Park
900 Exposition Boulevard
Los Angeles, California 90007

Dear Dr. Howard:

Your manuscript has been accepted for publication in the Journal of Paleontology. We call to your attention the page charge authorization recently approved by the Council. This is part of an effort to reduce the backlog through enlarging the Journal without the necessity of another dues increase.

Are you or is your department in a position to pay or help defray the publication costs of \$25 per printed page and \$50 per plate? Payment is obligatory for all plates over four. Two and one-half to three pages of typescript equal one printed page. Any amount that you can provide will help improve our position. Inability to pay will not affect publication which is scheduled on the basis of original submittal date. A bill is attached for your use.

Sincerely yours,

William A. Oliver, Jr.

William A. Oliver, Jr., or
Porter M. Kier, Co-editors

4 pp - 100.00
1 pl - 50.00
150.00
sent 100.00 7.28.64
1952

I apologize for our error. We certainly intend to acknowledge receipt of all ~~mass~~ ^{masses}.

Your manuscript entitled "A new geologic record of avian fossils from California, with a description of a new species of owl"

Was received On Feb. 4, 1964

Has not been received _____

Signed W^m A. Oliver J.



THIS SIDE OF CARD IS FOR ADDRESS



Dr. Hildegard Howard
Los Angeles County Museum
900 Exposition Blvd.
Los Angeles, California 90007

Dear Dr. Howard,

Your manuscript has been received and is accepted for publication. You can expect it to be published in the May 1965 issue. We are happy to take care of your insertions.

Sincerely,

Porter M. Kier

Porter M. Kier, or
William A. Oliver, Jr.
E-202 National Museum Bldg.
Washington, D. C., 20560

March 6, 1964

Dr. William A. Oliver, Jr.
United States Geological Survey
Room E 501
United States National Museum
Washington 25, D. C.

Dear Dr. Oliver:

On January 31 last I mailed my manuscript on a new Eocene discovery of avian fossils in California to you and Dr. Kier addressed to Room E 202 National Museum. The manuscript, entitled "A New Geologic record of avian fossils from California, with a description of a new species of owl," consisted of 9 typed pages plus 1 plate of illustrations and accompanying caption.

Will you be good enough to fill in the enclosed self-addressed postal card so that I may either be assured that the manuscript has arrived or start proceedings to trace it?

Sincerely yours,

Hildegarde Howard
Research Associate in
Vertebrate Paleontology

HH:gw

Encl.



IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

E-501 U. S. National Museum

December 13, 1963

Dr. Hildegarde Howard
Research Associate
Los Angeles County Museum
Exposition Park
900 Exposition Boulevard
Los Angeles 7, California

Dear Dr. Howard:

Your letter of December 6 was forwarded to us by Dr. Stumm, present Editor of the Journal of Paleontology, as we are Co-Editors nominate and will presumably be responsible for the issue in which your paper might appear. We do, at present, accept manuscripts from non-members for publication in the Journal of Paleontology subject to the same standards by which any contribution is measured. At present, there is an 18 month backlog. We expect to reduce this, but I doubt that our efforts will affect papers submitted now. I should point out, that the Journal is sponsored and edited by two societies and that this answer applies to the January-May-September issues published by the Paleontological Society. It is our understanding, however, that the SEPM backlog is somewhat greater than ours.

If you decide to submit your paper to the Journal, please send the manuscript to

Porter M. Kier and
William A. Oliver, Jr.
E-202 U. S. National Museum
Washington, D. C., 20560

Sincerely yours,

William A. Oliver, Jr.

plates
5 3/4 x 8 1/4
6. doz. views
5 EPM series
Jan May Sept
March, July, Nov.

December 6, 1963

Dr. Erwin C. Stumm, Editor
Journal of Paleontology
Museum of Paleontology
University of Michigan
Ann Arbor, Michigan

Dear Dr. Stumm:

This is to make inquiry regarding publication in the Journal of Paleontology. Do you accept articles from non-members of the Paleontological Society or S E P M ?

I have a paper in preparation (10-12 manuscript pages, with one*photographic illustration) recording two avian fossils from the Eocene of California and describing one as a new species. As this occurrence has geological significance as the first pre-Miocene record of birds in California, I thought of your journal as a medium of publication rather than one of the ornithological journals in which many of my previous papers on fossil birds have been published.

Before having the photographs prepared as one or two plates for illustration, I wanted to determine whether the article might be acceptable. Also, if acceptable, about when might publication be expected?

Yours sincerely,

Hildegard Howard
Research Associate
Vertebrate Paleontology

HH:gw

* 3 views, probably all on one plate

Paleontological Society

January 31, 1964

Messrs. Porter M. Kier and W. A. Oliver, Jr.
E-202 U. S. National Museum
Washington, D. C., 20560

Gentlemen:

The enclosed manuscript is transmitted to you after correspondence with Mr. Oliver. His letter of December 13, states that if acceptable for publication in the Journal of Paleontology, the paper could be expected to appear in the January, May, or September issue, about 18 months after transmittal.

Although cognizant of the fact that this is quite a "wait," I do feel that this is the proper journal in which to record a new geologic record for birds, not just another species. Therefore, I hope you will find the manuscript acceptable.

Yours sincerely,

Hildegarde Howard
Research Associate in
Vertebrate Paleontology

HH:gw

Enclosures: 9-page manuscript
1 plate

The Eish Eocene

6.18.64

~~A NEW GEOLOGIC RECORD OF AVIAN FOSSILS IN CALIFORNIA~~
~~WITH A DESCRIPTION OF A NEW SPECIES OF OWL~~

By

Hildegarde Howard

Research Associate, Los Angeles County Museum

ABSTRACT: The recovery of two avian bones from the Eocene of San Diego, California marks the first recording of bird life in California prior to the Miocene. A new species, Protostrix californiensis, (Order Strigiformes) is described, and the Order Gruiformes tentatively recorded.

INTRODUCTION

The avian record in California has heretofore been limited to Miocene, Pliocene and Pleistocene listings. Reptiles, and mammals have been recorded from earlier deposits in the state, but pre-Miocene birds had never been recovered. Now, two separate localities in San Diego, California have yielded one bird bone each from deposits of Eocene age.

The more diagnostic of the two specimens, a humerus, Los Angeles County Museum (LACM) no. 6171, was recovered from one of many chunks of "arkosic" sandy matrix excavated in 1962 by Mr. F. A. Tyler of San Diego from a road excavation in a new housing development east of Lake Murray (LACM locality no. 1723). The matrix contained many mammal fossils, several of which have been identified by Dr. J.R. Macdonald, Curator of Vertebrate Paleontology at the Los Angeles County Museum, as of late Eocene age. Recent mapping of the area (Strand, 196²) indicates that the beds

in this area are of the continental Eocene, Poway formation.

A tibiotarsus (LACM no. 2851), too poorly preserved for definite identification, was found in 1956 by Mr. Joseph Arndt of San Diego, in the quarry of the Pre-mixed Cement Company located in Mission Valley, on Friar's Road near Murphy Canyon (LACM loc. no. 1877). According to Arndt, the specimen came from the Poway conglomerate about 10 ft. below the contact with the overlying silts. Upon examination of the matrix, Mr. Harry Turver, formerly with the Standard Oil Co. paleontological laboratory in Los Angeles, found no Foraminifera, and stated that the material resembled other matrix specimens taken in the same general area from the continental prongs of the Poway formation. Recent discussion of this area on Friar's Road (Milow and Ennis, 1961:27) substantiates Mr. Arndt's and Mr. Turver's opinion.

ORDER STRIGIFORMES

Family Protostrigidae Wetmore 1933

The humerus from locality 1723 is assigned to the Strigiformes on the basis of its well flared distal end with small condyles relatively even in distal contour; and its well inflated, though narrow bicipital surface, with deep bicipital furrow extending well past the median line of the bone.

The bone is considerably stockier and more curved than the humerus of living owls of comparable size, and in this respect superficially resembles the hawks and caracaras. Among the smaller living owls, however, Surnia has a humerus of similar proportions and curvature. Other qualitative differences from existing owls are evident, the more basic of which are found in the extinct family Protostrigidae as exemplified in the type distal end of humerus of Protostrix saurodosis (Wetmore, 1921) from the Bridger Eocene

of Wyoming. Most important are the lateral extension of the ectepicondylar area, delimiting a shallow groove or depression external to the external condyle and obscuring the external ligament attachments from palmar view; the large attachment of the anterior articular ligament; the merging of the median condyle into the palmar face of the bone without sharp decline; and the absence of a secondary prominence on the distal contour of the median condyle towards the internal side.

Significant differences from Protostrix saurodosis justify taxonomic separation, which, at the present state of knowledge of Eocene owls, it seems wiser to consider at the specific, rather than the generic level. The California species is, therefore, designated

Protostrix californiensis, new species

Plate 49 Figs. 1 and 3

Type.-- Left humerus, partly crushed proximally lacking head and internal tuberosity and internal tip of entepicondyle. LACM no. 6171, collected by F. A. Tyler, June 29, 1962.

Locality.-- LACM loc. no. 1723; 300 yards north of intersection of Lake Shore Drive and Jackson Drive, east of Lake Murray, San Diego, California.

Formation and age.-- Poway formation, in 6-12 inch lens of sandy silt, 3 ft. below conglomerate; late Eocene.

Diagnosis.-- Relatively short, stocky humerus with marked lateral curvature of shaft; olecranal fossa with slight horizontal depression immediately above median condyle; anconal border of entepicondyle well developed and forming distinct internal margin of internal tricipital groove; internal tricipital groove well internal in position, running diagonally to terminate on internal

margin of shaft just above entepicondylar prominence; entepicondylar area broken away at internal tip, but well developed anconal portion and slant of internal margin of shaft suggest development equivalent to that of P. saurodosis, and perhaps closest to Surnia and Speotyto among living owls; attachment of anterior articular ligament facing almost directly palmar, with palmar surface slightly convex, and upper and lower margins slightly curved; groove between attachment of anterior articular ligament and median condyle clearly marked; diagonal groove on palmar surface of median condyle more nearly horizontal in position than in living owls, and median condyle more evenly and smoothly rounded in all contours; area between brachial depression and median condyle shallow, with gradual descent from condyle to depression; brachial impression well centered with respect to lateral margins of shaft, and triangular in shape; external condyle narrow and slightly sigmoid at proximal tip; intercondylar furrow well marked; ectepicondylar area produced laterally, with groove-like depression adjacent to external condyle on palmar face; external border of ectepicondylar area thickened, rounded in external contour, merging proximally with horizontal muscle scar above condyle, and lacking evidence of the sharp projection found in living owls. Proximally, capital groove well-defined at extreme proximal extremity, but broken below; ligamental furrow broad but shallow; distal extremity of deltoid crest well median in position on shaft, with short intermuscular line extending below; anconally, shaft below head with high, angular apex, sloping steeply on either side; pneumatic fossa less constricted than in Bubo.

Measurements.-- Length of humerus from distal contour of median condyle to capital groove, 105 mm.; distance from distal extremity of deltoid crest to distal contour of external condyle,

67.8 mm.; greatest breadth of pneumatic fossa, approximately 9.3 mm.; breadth of distal end from ectepicondyle to outer contour of attachment of anterior ligament, 18.6 mm.; breadth of shaft at base of deltoid crest, 8.9 mm.; breadth of shaft immediately above brachial impression, 10.3 mm.

Discussion.-- In general size as judged by breadth of distal end of humerus, P. saurodosis and P. californiensis could fall within the size range of a single species, but qualitative characters serve to distinguish them. Most notable distinctions lie in the relatively heavier shaft in P. californiensis, broader, shorter brachial impression, more convex attachment of the articular ligament, more marked groove between this attachment and the median condyle, and between median and external condyles, more rounded median condyle, and more sigmoid external condyle with narrower tip. The characters of the olecranal fossa and brachial depression are less clearly defined in P. saurodosis than in P. californiensis, but both areas appear slightly more depressed in the California species.

Three other species of Eocene owls have been recorded from North America, all with distal end of tibiotarsus as type, and no humerus available. All are from Wyoming. Protostrix lydekkeri (Shufeldt), which is the type of the genus, and P. leptosteus (Marsh), like P. saurodosis, are from the Bridger formation; P. minica Wetmore is from the older Wasatch formation. From the excellent reviews of P. lydekkeri and P. leptosteus by Wetmore (1933 and 1937, respectively) the peculiarities of these two species that place them in the same extinct genus are clearly shown, notably, the marked narrowing of the external condyle and the heaviness of the internal condyle. As P. saurodosis was also found

added
6.18.64
+ sent

Early Tertiary owls have also been recorded in Europe, from the phosphate beds of France of late Eocene-early Oligocene age, as follows: Bubo incertus Milne-Edwards, Asio henrici Milne-Edwards, Necrobyas harpax and N. rossignoli Milne-Edwards, N. edwardsi Gaillard, and Strigogyps dubius and S. minor Gaillard. These forms have never been analyzed for possible relationship to the American Protostrigidae, and I would not attempt to do so here on the basis, solely, of the published descriptions at hand. Illustrations of the humerus are available only for Asio henrici (Gaillard, 1908:38, fig. 4) and Strigogyps minor (Gaillard, 1939:11, fig. 4).

Gaillard's (1908:30-40 and 1939:6-11) descriptions, measurements and illustrations do, however, justify the specific separation of the California owl from any of the European forms. Asio henrici, Bubo incertus and all three species of Necrobyas were undoubtedly smaller birds than Protostrix californiensis, whereas Strigogyps dubius was markedly larger. Strigogyps minor, which most nearly approached Protostrix californiensis in size (total length of humerus 118 mm.) is set apart by many peculiarities of structure of the humerus, most notable of which are the reduced deltoid crest and bicipital surface, diminished pneumatic fossa, lateral position of the brachial impression, and longitudinal position of the internal tricipital groove, distally.

complete p. 6 →

in the Bridger formation of Wyoming, Wetmore's decision (1933:4) to include it in the genus Protostrix is justifiable. P. mimica stands apart from the other species by reason of its small size, but even more significantly, when compared with P. lydekkeri and P. leptosteus, by the heavier external condyle of the tibiotarsus. In fact, Wetmore (1938:28) suggests that the generic assignment of this species may be subject to revision.

Protostrix lydekkeri was obviously a much larger owl than either P. saurodosis or P. californiensis. But either of the latter species could, I believe, have had a tibiotarsus of the size of that of P. leptosteus. In view of the wide geographic separation, and probably slightly later age of the California specimen, I feel that separation of P. californiensis from P. leptosteus is justified. If more owl bones should be found in the Bridger formation of Wyoming, the synonymy of P. saurodosis with P. leptosteus might be indicated.

*Insert
P. 6a* → P. californiensis does not resemble any Recent species of owl sufficiently to suggest ancestral relationship. Such resemblances as can be noted are probably quite superficial, as for example, the curvature of the shaft and stocky proportions paralleled in Surnia ulula, and the broad, short, brachial impression, and median position of the deltoid crest found in Ketupa javanensis. ~~On the whole, relationship is closer to the Strigidae than to the Tytonidae.~~

ORDER GRUIFORMES ?

Plate Fig. 2

The tibiotarsus (LACM no. 2851) from locality 1877 lacks the proximal articular surface, both cnemial crests and the posterior and distal contours of the distal condyles; the anterior

The approximate length of the bone is 110 mm., with dimensions at middle of shaft, 7.3 mm. (breadth) and 5.9 mm. (depth).

7

contour of the condyles is incompletely preserved. Because of the absence of these critical areas, the bone cannot be definitely allocated.

Its stocky proportions suggest galliform or cathartid affinity, but more detailed characters are not upheld by living members of either of these groups. Most notable of the few detailed characters that remain on the fossil specimen are as follows: tendinal canal nearly median in position on shaft; supratendinal bridge narrow and straight, convex anteriorly with small protuberance external to its lower border overhanging the intercondylar fossa; area external to bridge raised, terminating proximally in a small papilla about $4\frac{1}{2}$ mm. above external condyle; groove for peroneus profundus well marked for a distance of at least 7 mm. above (and external to) the papilla; proximally, internal ligamental attachment prominently projected; internal cnemial crest, though broken away, apparently short (terminating above the level of the proximal tip of the fibular crest), nearly median in position on shaft and continuous with rounded median apex of shaft rather than with intermuscular line; intermuscular line internal in position, between internal ligamental attachment and median apex of shaft; fibular crest short, but well set off from shaft throughout its length; internal surface of shaft very slightly rounded below level of fibular crest, and longitudinally bordered along both anterior and posterior margins by intermuscular lines, giving slightly angular contour to shaft.

Many of these characters, particularly the prominent proximal internal ligamental attachment, position of intermuscular lines, short, clearly demarcated fibular crest, development of groove for peroneus profundus, and raised area adjacent to supratendinal bridge, are duplicated in the tibiotarsus of Cariama (Order Gruiformes),

although the proportions of the fossil bone are markedly different than in this slender-legged Recent genus. In general, however, characters of the distal end are closer to those found in gruiforms than to those of any other group. Several extinct genera of Gruiformes are known from the early Tertiary of Wyoming, South Dakota, Nebraska, and New Jersey, and two extinct families are recorded. One family, ^{from the Early Eocene,} Geranoididae Wetmore, was probably related to the cranes, the other, Bathornithidae Wetmore, known from the lower, middle and upper Oligocene, was related to the Cariamas. The California bird may have been related to one of these families.

ACKNOWLEDGMENTS

My thanks are extended to Dr. Alexander Wetmore for the opportunity to examine an excellent cast of the type of Protostrix saurodosis at the United States National Museum, and make use of the collections of Recent bird skeletons at that museum for comparison with fossil owls.

This study was carried on as part of a survey of avian fossils of the west under a research fellowship from the John Simon Guggenheim Memorial Foundation, to which I wish to express my gratitude.

Photographs were made by George Brauer, retouched by Pearl Hanback^k.

LITERATURE CITED

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1961. Guide to geologic field trip no. 2, southwestern San Diego County. Guidebook for field trips, 57th An.. Meet. Cordilleran Sect., Geol. Soc. Amer., San Diego State College, pp. 23-43.

~~Strant, C.~~

* Insect
Gaitland
famp-9

Gaillard, C.

1908. Les Oiseaux des Phosphorites du Quercy. Annal. Univ. Lyon,
¹⁷⁴⁷
~~hexsexix~~ 23:1-150.

1939. Contribution à l'étude des oiseaux fossiles. Archiv. Mus.
Hist. Nat. Lyon, 15:1-100. fig 1-34

not included in ms for pub.

Strand, C.

1962. San Diego-El Centro Sheet, Geologic Map of California.
Olaf P. Jenkins ed., Calif. Div. Mines and Geol.

Wetmore, Alexander

1921. A fossil owl from the Bridger Eocene. Proc. Acad. Nat. Sci., Phila., 73:~~455~~-458.
1933. The status of *Minerva antiqua*, *Aquila ferox* and *Aquila lydekkeri* as fossil birds. Amer. Mus. Novitates, 680:1-4.
1937. The systematic position of *Bubo leptosteus* Marsh. Condor, 39:84-85.
1938. Another fossil owl from the Eocene of Wyoming. Proc. U.S. Nat. Mus., 85 (3031):27-29.

Explanation of Plate

Figs. 1. Protostrix californiensis, n. sp., type humerus, LACM
no. 6171, anconal view; fig. 2. Order Gruiformes ? tibiotarsus LACM
no. 2851, anterior view; fig. 3. Protostrix californiensis, n. sp.
type humerus, palmar view. Poway Eocene, San Diego, California.
All figs. ^{approximately} x 1½.

Dr. Pierce Brodtkorb
Department of Biological Sciences
University of Florida
Gainesville, Florida

Enclosed is a carbon of my insertion concerning European owls in my paper on the California Eocene owl. It may be of some use to you in your Bibliography and Catalogue, though, as you will see, I really haven't said anything decisive regarding family relationships.

The humerus of Strigogyps minor is a wierd one -- about as strange as the tibiotarsus referred to S. dubius. The deviation from the norm being about the same in both elements, Gaillard was probably right in assigning them to the same genus. From illustrations of both elements, the genus is far removed from the Protostrigidae. Probably Gaillard is right in thinking it links up somehow with the vultures, though I have not attempted to run down this line of thinking.

Hildergard

Written in L.A. Aug. 1963, prior to eastern trip.

Humerus from Poway Excav. - Lake Murray, San Diego, CO., ^{Loc. 1723} ~~Calif~~

General shape as in hawks and owls.

More owl-like in prominent bicipital area on its inner side, with marked depression medially. Shaft rising to acute angle distal and medial to pneumatic foramen. The acromion is found more in hawks and falcons than in owls, though both are deep.

Shape of brachial impression more triangular in *Bubo* than in *Strix*, *Tyto*, *Nyctia*, less the long slim oval. Fossil closest to *Nyctia* (H. 1282), *Ectepicordylus* area more rounded than in any existing owl and lacks sharp prominent. Attachment of ant. art. lig. oval, slightly convex, facing largely palmar, less rotated medially than in *Bubo* or *Tyto*, closest to *Strix*.

Pneumatic foramen of fossil crushed - seems narrow and not with pneumatic openings.

Deltoid crest broken but junction with shaft is rather medial to shaft edge. Intermuscular line runs distally from crest, bends out about 11 mm. below to join longitudinal running both distally + proximally; junction is more squared off than in most owls (more gradual joining of the lines in the others). Proximal-most scar quite lateral in position, less close to apex of shaft than in existing owls.

Shaft quite sigmoid, like + the acute apex are like Caracara but high bicipital crest swollen anteriorly + wide flange distally owl-like; also bluntly rounded contour (int. view) of border of ant. art. lig. attachment - like *Bubo* (some owls pointed). Ectepicordylus broken but appears to have been no more prominent than existing owls - not swollen as in hawks, though perhaps more prominent anteriorly than in owls. Shallow olecranon fossa.

meas. over →

		#1082 V. shufeldti	F 55° 18' 1 shufeldti	#230 Bubo
Dis. length forest to ant. art. lig.	5.7 mm	5.1	—	5.1
Length longest condyle	7.8	2.6	—	2.8
Length from end deltois crest to dist. end	67.2	79.7	70.3	67.6 85.9
Length from horiz. distal condyle to capitulum groove	105.00	118.2	101.6	101.5 124.3
Breadth dist. end to lig. scar	18.6	21.1	17.9	— 18.5
int. side above dist. end	16.8	—	—	18.0
Length occipital crest to cap. groove	—	—	5.9	4.7 —
Breadth pneumatic foramen	9.37, 59.7	—	—	—
Breadth shaft at base of deltois crest	8.9	—	—	8.5
Least breadth shaft dist. to base of pneumatic foramen	8.1	—	6.6	— 8.5
Breadth shaft middle above brach. imp.	10.3	12.2	12.2	— 14.9
Greatest length brachial impression	11.2	6.0	3.7	— 3.65
Breadth	5.0	—	—	—

8.20.63 U.S. Nat. Mus. (cat. of *saurodon* at hand)
Pioneer calch. cf *P. saurodon*

Shaft at distal end rel. broader.
(humer. ectepicond. is broken away & it would look broader with it)

End of ectepicond. process may be broken as the area is rounded

As they stand, neither specimen has the abrupt process of living ones yet both proceed higher on shaft than

in living forms. Also in both fossils the lig. attachment lies anterior to the ~~pro~~ rounding out of the ectepicondyle itself (dist. to process) whereas in living forms the lig. attach. is evident in palmar view, (this must be what Wetmore describes as "lateral epicondyle produced, shelf-like bet. base of ectepicond. proc. & radial tuberosity, confluent indistinctly with base of shaft" - etc)

^(radius) Ext. condyle more narrowed & sigmoid toward prox. tip than in *saurodon* (tip turning more medially) *saurodon* br. 3.5 at tip, 2.9 in calch. The length is same. Middle condyle more rounded both distally & palmar but still resembles *saurodon* in absence of secondary distal protrusion char. of *sauro* & other living ones.

Ext. lig. attach. (= "pronator flexor attach" of Wetmore) is long as in *saurodon* and set at same generally diag. position as in " " but face has slight convexity whereas *saurodon* seems flat.

More marked groove between this attach. & middle condyle (area is shallow in *saurodon*)
Space bet. mid. & ext. condyles is about as in living ones whereas *saurodon* is very narrow here.

Occasionally more deep groove adj. to ext cond. in calch. faded by lime that increases prox up shaft on the diag. so that it runs off shaft on its side. Don't see such line in *saurodon*. Mid. condyle more rounded anteriorly & undercut all along, only undercut at ext edge in *saurodon*. Whole palmar surf more excav. in calch.

Aug. 1963, La mesa to east, Calif.

Pseudostrix californica

Type. — Left humerus. Making head ~~depressed~~ ^{and with} external tuberosities and entepicondylar prominence, ~~shaft~~ ^{plus contour of pneumatic foramen} ~~displacement included~~.
J. A. Co. Mus. no. collected by F. A. Tyler, June 29, 1962

Locality: Laco mus. loc. no. 1723, Lake Murray
San Diego Co., Calif.

Similar to type humerus of *Pseudostrix saurodosis* in small distal condyles + less production of ulnar condyle distally at its lateral edge

	Humerus ln. dist	Fibia ln. dist	% tib. hum.
Katuba B1 1282	21.15	13.2	61.5
Shiva 1851	16.9	11.5	68.1
Bubonix 930	20.45	14.0	67.6
Sumia ulula	12.2	9.2	75.4%
<i>Pseudostrix saurodosis</i>	18.7		
<i>P. calif.</i>	19.5(?)		
<i>P. lydekei</i>		16?	Larger than all
<i>P. leptos.</i>		13.5	could be same as saurodosis
<i>P. murina</i>		11.5	(like shiva)
leptos to saurodosis		72%	
" " calif.		69%	

USNM Mar 8, 27.63 wing cast of *P. modernus* & *humboldtensis*
(see small note left)

All genera of living owls have the extra distal bulge on the median ~~contour~~ edge of the distal contour. This is lacking in *Sauvadoris* & *Calif.*

Nyctia & *Pulsatrix* have a deeper, narrower notch between the ectepicondyle & the ulnar (^{int} ~~ext~~) condyle as seen anomalously being close to *sauvadoris* in this respect than are other living genera. *Calif.*, on the other hand, has the notch broader & shallower as in the other genera in fact quite shallow.

The 2 fossils agree (+ differ from all modern) in lateral extent of the ectepicondyle (palmar view) producing a sort of protected groove or "basin" between the radius (ext.) condyle & the ext. border & hiding the lig. attachment of the ext. edge from palmar view. Neither fossil has an ectepicond. proc. present in *Calif.* It is doubtful that it was present at all as the outer edge is ~~of~~ forms a fairly broad, border that curves medially & connects (?) with the horizontal muscle scar above the ^{radial} ~~ulnar~~ condyle. *Sauvadoris* is somewhat like this, but may have been broken (as that of *Uetinus*; cast not clear on this)

In most living forms the basal. dep. is diagonal, long & narrow & *sauvadoris*'s is similar. The depression is ~~hooky~~ & broader in *Calif.*

<i>Pulsatrix</i>	14.7 long	x 4.5 broad	18.8 or dist	21.8	25.0 dist end to tip. basal side
USNM <i>Nyctia</i>	13.4 "	x 6.0 "	23.0 "	21.2	
1212 <i>Sauvadoris</i>	13.7 "	x 6.4 "			
<i>Sauvadoris</i>	15.3 "	x 5.7 "	23.3 "	25.0 "	
<i>Sauvadoris</i>	12.9 "	x 3.6 "	18.6 "	19.0 "	
<i>Calif.</i>	12.2 "	x 5.25 "	20.46 "	21.5 "	

Large int. lig. attach. ("pronator basis" of *Uetinus*) is flat in *sauvadoris* & palmar contour straight as viewed int'l. & not project. palmar as much as living ones (Tyto, incidentally, has pronounced palmar joint). *Calif.* is more convex (palmar surface) than *sauvadoris* it lacks a pit on palmar contour & rounds into fn. as in *sauvadoris*. *Calif.* surface of attach. has bent (*sauvadoris* straight & flat)

Calif. faint & diagonal groove on palmar side of middle condyle is more nearly horizontal than in living genera. It is the upper border of this groove in living birds that forms the additional bulge distally on the middle condyle as the groove sweeps down. A very faint bulge occurs in *Calif.* but much further toward int. edge & more than middle condyle

The form is not a *Sauvadoris* *sauvadoris*, but may be *Uetinus* etc.

X Prodothis lydekkeri was originally Agouti lydekkeri Shufeldt
 1933 described with A. antiqua & A. ferox from
 the Bridger Eocene. Later antiqua & ferox were
 placed by Shufeldt in a new genus of owl (Minimus)
 Wetmore examined the lydekkeri material (after
 concluding that antiqua & ferox are edentate)
 & decided that one distal end of fibrotarsus
 is owl - erecting the genus Prodothis

Odd character is very narrow external condyle partly
 very broad internal condyle almost
 very little depression above condyles anterior

quite large Distal depth 12.9 mm
 Br shaft (low) 11.8
 Distal breadth 16.0? from illus.
 Br ext cond 4.6
 Br int cond 6.3

Prodothis mimica Wetmore - Wasatch Eoc., Wyoming
 1938 Ext. condyle more normal in width than lydekkeri

smaller than
sauvadoris
 presumably
 therefore smaller
 than P. calif.

Br. distal end 11.5
 Br shaft (low) 8.9
 Dist. depth 10.5 (ext.) (9.0 int.) from illus.
 intercondylar groove partly more acute

X Prodothis leptaeus - = Bubo leptaeus Marsh 1871 1st Bridger
Wyo.

Bears similarity to P. lydekkeri in narrow
 ext. condyle

1937
 by Wetmore
 this genus
 size of P. P.
sauvadoris

Br. distal end 13.5
 Dist br. shaft 8.4
 Depth 5.0
 Br sh (low) 10.0? (from illus.)
 Dist depth 10.4? " "

Prodothis sauadoris Wetmore humus Bridger Eocene
 Bet. S. vari & Bubo in size - Mimica smaller

X P. lydekkeri & P. leptaeus are closely similar but P. mimica could
 be a dif. genus, ext cond. is broad, (int is broad in others
 & int. is short ant. partly (2 conds nearly same length in others)

Over

Bubo incautus Milne-Edwards <sup>→ "Sur les osseaux fossiles des dépôts
sereux de phosphate de chaux,"
2^e Congrès Ornith., Budapest, p. 65, 1891</sup>

Phosphorites du Quercy - type humerus
Total length 91 mm., br. prox. 16 mm; br. dist end 16 mm;
length "diaphyse", 6 mm. Gaillard found none in his study.
Gaillard p. 35 says (translation) humerus is strongly curved
"en dedans"; its inferior extremity is "large" and flattened
anteriorly; the humeral head is less renflée. The
pectoral crest is prolonged on a greater longueur (than that of
javanicus?) + the surface of insertion of the biceps is
shorter but broader (élargie).

Asio Henrici Milne Edwards - same ref.

Type + tibiotarsus + foot bones.

Gaillard found tibia, tarsometatarsus + humerus

Tibia Br. dist end tibia 8 mm

Depth " " " 6.8 mm

Trans diam. "diaphyse" = 3.5 mm.

Humerus

Br. dist end 10 mm.

Trans diam. (least) of body of bone 4 mm.

Strigopsis dubius Gaillard - Ex. Oligo Phosphorites de Quercy

Principal dif. from living owls is great thickness (ant. post) of the distal articulation & shallowness of the intercondylar gorge posteriorly. The greatest depth of this gorge is very near the internal face of the bone proves that the articular facets of the talonemeta had unequal surface, the external being much greater than the internal.

Tibial condyles developed about as in *Oxygys auricularis*. The ext. condyle is higher than the internal whereas the reverse is true in most nocturnals.

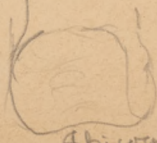
The absence of the osseous bridge classes *Strigopsis* with the *Strigidae* altho the Calao & Peroquets are equally lacking in this bridge.

Tibia of *Strigopsis* free in general aspect ~~on~~ great similarity to vultures. At the same time the absence of the osseous bridge is a char. essential characteristic of the "nocturnes" so the genus is tentatively assigned there.

Pr. dist condyles	19.6 - 19.9	(from illus.)	= { meas on distal view 18.2 ext condyles 19.1 int " depth
depth ext or int cond.	19.2	(measured from illus.)	
HT ext cond	15.4, 5	on ant. face	
HT int cond	12.6	" " "	

Dist. face of distal end has papilla for attachment lig.; none on ext. side.

Illus. shows intercondylar surface posterior not excavated as in owls but has broad surface convex across its prox. surface



Strigopsis



Bubo

1723 Lake Murray T.D. ~~field~~ books

Hypetragus upper & lower dentition
& skeletal remains called by T. Gierat

This loc. given to Mus.

humans

Loc. is 300 yds. no. of interesting
Twin Lakes & Jackson Drive, S.D., east of
Lake Murray. Taken into "1" bed of
"arkosic" sandy silt, congl. lens above this about 3'
Exposed for gas line; cut is 15' below original surface
Dominant white silts & buff clays
interbedded with well rounded cobbles
& gravel in conglom.

Loc. Arndt loc. (never #d) Dec. 1956

Quarry of Pre-mixed Cement Co., Mission Valley,

X. Turner

~~1/4 mi. west of intersection of Lucas Rd. & Murphy~~

on Lucas Rd, 1/4 mi. west from its intersection
with road in Murphy Canyon. [Arndt's letter

said bird bone ~~2 yds. of further down~~

were found in Porray conglom. 10' below contact
with silts above.

Jan 10, 1957 Harry Turner examined the
matrix in which bird bone was called by Arndt
& said (verbally) no forams. "Must be like
from one of the continental groups of Porray fm.
look like what he had examined before from the
area."

U.S. Nat Mus 8,23,63

Alloporcheus greggii

~

Neoschisma pulchra

longer straighter buccina

more pointed posterior buccina
attached

more rounded buccina

Neither one has short
ridge

as median set as *Anabacanth*
fractally mips with edge
of post. crest

CIT 314 Poway

La Jolla Quadrangle 117° 10' 31" R 3W, 32° 45' 10" T16S

Branch of Tecolote Valley approx 20' above

contact of Poway Canyon & San Canyon Shale S.S.

CIT 249, San Diego Escume from cliff face,
on west side of San Diego River approx $\frac{1}{4}$ mi
NE of San Diego Mission, S.D. Co.,
SS interbedded with conglom.

CIT 250 From N.E. side of road cut on
S.D. - Escondido highway at entrance
to Murphy Canyon from S.D. River
Valley, on thin pebbly lens in
white SS, 2-3' above highway.

See also Mus. 1723 Lake Murray S.D. Esc. Poway Conglom.

"Hanging tract" in cut of S.D. S. side in road excav about
150 ft south of intersection of Lakeshore Dr. & Jackson Dr.

east of Lake Murray, three boxes of bone-bearing matrix

taken in "arkose" sandy silt grey to white color
congl. lens overlying about 3 ft. fossils called by

J. A. Tyler see T.D. book p. 161 no. 7 1762

T city map in folder on file June, 1962

over

~~Thin strata~~
~~above~~
~~below conglom~~

CIT Loc 314 "Poway conglomerate and crossbedded ss
exposed at CIT loc 314; San Diego Calif.
Stock, 1939 more correl. data - Amynodont
Stock, 1948 Bull. of SA vol 59 pp 330-331
Stock - re: age of Poway Titanotheres
CIT Proc. Nat. Acad. Sci vol. 23 (2): 48-53
Loc 249 Feb. 1937 see spec. pp 52-53

See also Hanna UC Pub. Bull. Dept. Geol. Vol 16: 187-246
1926. with maps.
and op. cit 1927 pp 256-263

CIT loc 249 White ss Assoc. with Poway conglomerate
exposed on west bank San Diego river
1/4 mi N + E San Diego mission
Titanotheres here? also a primate & a mixodictid

Chico Jarsi [For comparison with #2851 from
Excess of San Diego

- Tendral Bridge & groove below
Piceallaryum Tendral narrow bridge long & narrow,
Very nearly vertical groove in Albatross & Shearwater
and bridge slightly internal to median. Groove deep
Bridge brachially horizontal
Pelicaniform Groove is diagonally placed so it goes more
externally at top, more internally below. Bridge is
Therefore diagonal also in pharyngeal direction - ~~is~~
edge more internal edge higher than ext.
At least in Pelican & cormorant bridge is
quite externally placed (not int. as in Piceallaryum)
Solidas more central but the diagonal is still more,
Groove deep in Pelicans & cormorants
Tendral varies in shape, but not long.
- Ciconiiformes Relatively narrow groove under wing (prox-dist) Bridge
placed well internally. Groove nearly vertical
Very prominent lig. attachment at ext. edge of bridge in
stork, wood stork & flamingo. Present but less marked
in Platalea & Ardea & Egret. Lig. attach. above bridge, rather high
Bridge nearly horiz. (prox-dist) & set well forward (not similar)
- Anseriformes Bridge median placed, about horiz. (prox-dist) but
rather sunken into bone. Groove relatively straight,
Lig. attach. above bridge right at prox edge of bridge
Groove deep
- Cathartidae Groove slightly diagonal up(ext), down(int). Center of bridge
narrower than either [slant of groove become very marked in
hawk & eagle] Prox. edge of bridge curves well upward &
Bridge seems slightly twisted in slight diagonal position
Only a slight rise ext. to bridge (above ext. condyle) & not on
distal lip of bridge. Such indication of convexity on distal lip of
Bridge as exists is no more than a very slight swelling on
The part of the bridge that faces internally rather than
direct distally. Condyles tend to finish in below bridge area

223 Jacana
18365 Rallus?
1120 Fulica
294 Cariacus
220 Juv
30 Juv

1374 Ibis
1124 Carmichaelia
1750 Aidea
1640 mycteria
242 Euxemura(?) Stoh
235 Phoenicophanes

791 Agriuscharis
1061 Crax
1649 Crax
? Ontalis Chachalaca
1634 Pheasant

226 Gyphochoerus Old World Vulture
716 Coragyps
737 Sarcocapillus
1800 Gymnogyps

Galliformes Groove almost vertical. Bridge wide, fairly straight, bordered lower margin slightly slanted upward internally and greatly very close to prox tip of internal condyle (spec. in Cracidae, ^{Phasianus} less marked in Meleagrides). Raised area ext. to bridge is not large & does not go onto lip. Lip. groove is extensive, well margined by ridge.

Gruidiformes Groove practically vertical, bridge practically straight, breadth (prox-dist) of bridge varies - very wide in grouse, narrower in Gallidae. ~~Lower margin~~ Bridge practically horizontal, lower margin fairly practically straight downward, but with slight convexity antly & curvature up ~~ext.~~. Entire bridge slightly convex antly in Gallidae & Jaculus, space bet. int. edge of bridge & prox edge of int. condyle. Area ext. to bridge raised ^{spec. in Pterocarpus} & runs from ~~int. condyle~~ ^{int. condyle} prominent occur in intercondylar area & runs up above ext. condyle. Ext groove well margined with ridges & ~~runs~~ runs from slightly below tip of ext. prominence & up shaft above it.

Review of Ciconiiformes compared to Gruidiformes Herons, egrets & ibis close to Cariamiformes, superficial. But groove of tendinous groove below bridge is more rounded less a slit in heron ^{etc} group. Raised area ext. to bridge is developed similarly in all & well margined ^{ext.} ext. it also present. Cranes & storks have the ext. prominence very marked but the area is divided into 2 prominences in storks, blended in one in grouse. There is no ext. tendinous groove in storks, but a wide scar on ext. side of shaft. Flamingo ext prominence all one but medially placed. Ext tend. groove is on ext face of condyle & slightly up shaft.

Charadriiformes Supratendinous bridge sinks back into ant. surface. Prox. side of bone above int. condyle reaches bridge narrow (prox-dist). Surface ext. to bridge varies in development. Ext groove margined, post margin tending to protrude.